	IR	NIR	p
Overall mortality (%)	9.3	2.4	0.05
Cardiac death (%)	5.6	1.9	NS
Recurrent angina (%)	24.5	28.5	NS
Nonfatal MI (%)	0	0.5	NS
Total revascularization (%)	10.2	14.0	NS
Target lesion revascularization (%)	8.2	10.5	NS

Conclusion: Coronary stenting in IR and NIR diabetics resulted in a low rate of immediate complications, similar to non-DB group. Despite similar rates of recurrent symptoms and TLR during mid-term outcome, mortality was higher in IR pts as compared to NIR diabetics.

882 Atrial Fibrillation and Flutter: Mechanisms of Tachycardia Maintenance and Ablation

Wednesday, April 1, 1998, 10:30 a.m.–Noon
Georgia World Congress Center, Room 256W

10:30

882-1 Distinct Anatomic Patterns of Right Atrial Endocardial Activation During Atrial Fibrillation

C. Gomick, G. Pierpont, J. Hauck, B. Pederson, A. Kadish. *VAMC and U of MN, Mpls, MN and, Northwestern U, Chicago, IL, USA*

Background: Advances in catheter based treatment of atrial fibrillation (AF) will require improved mapping to identify critical areas needed for initiation and maintenance of different forms of AF.

Methods: A 9Fr noncontact balloon multi-electrode array catheter (EnSite), (Endocardial Solutions Inc.; St Paul, MN) permits rapid endocardial isopotential mapping (EIM). To assess activation wave front patterns, 6 anesthetized normal dogs each with 2 episodes of stable (>30 s) AF induced with rapid LA pacing were studied. EnSite via the right femoral vein was deployed in the middle of the RA. A standard deflectable tip 6Fr EP catheter attached to a locator signal was used to generate 3D reconstruction of RA interior dimensions and location of SVC, IVC, CS, and TV.

Results: Spectral analysis of noncontact electrograms during AF (CL 129 ± 5 ms), had a mean peak frequency of 7.2 ± 2.7 Hz and centroid frequency ± 0.9 Hz. During 2.5s segments of stable AF 46 ± 16 distinct wave front initiations (WFI) were seen with 0.92 ± 0.47 wave fronts present at any given time. Of these, 32% of sites were unique (occurred once) and 68% repeated. Repeat AF episodes in the same animal were similar. In all animals areas in the mid septum, high lateral, and low RA were frequent sites of WFI. Large areas of the RA were unassociated with WFI and were activated only secondarily.

Conclusions: Pacing induced AF in normal dog heart has similar frequency characteristics to that reported for human AF. EIM suggests RA activation patterns similar to human type II AF. Frequent association of WFI with anatomic areas such as the mid RA septum, CS, and high lateral RA suggests that the location of these structures is important in AF but the mechanistic and therapeutic implications remain to be determined.

10:45

882-2 Protected Mitral Annular Circumferential Activation Uncovered by Discrete Radiofrequency Lesions

J. Cheng, P.C. Dorostkar, R.J. Lee, M.D. Lesh, L.A. Saxon, M.M. Scheinman. *Univ. of California San Francisco, USA*

Background: Protected right atrial activation due to anisotropy and/or anatomic obstacles is critical for the maintenance of typical atrial flutter. Little is known about the existence of protected activation of the left atrium (LA).

Methods: We studied 27 patients (pts) with AVRT using a single concealed left lateral accessory pathway (AP). Recordings were obtained from His bundle, right ventricle (RV) and from a decapolar coronary sinus (CS) catheter with its tip in the distal CS (dCS) and proximal electrodes (pCS) at the os. A 4 mm tip ablation catheter (AC) was used to map along the mitral annulus (MA) during AVRT. Radiofrequency (RF) energy was applied during either AVRT or entrainment with RV pacing.

Results: Before ablation, all pts had a CS activation sequence from dCS to pCS during AVRT or RV pacing. In 3 pts, reversal of CS activation sequence occurred abruptly with altered CS atrial electrogram morphology during initial ablative attempts that were more medial to the AP, although the retrograde AP conduction time at AC was unchanged (Figure). The time interval between the atrial electrograms on the proximal AC and dCS increased by 86 ± 10.5 msec ($p < 0.01$), indicating block in a protected conduction zone. The time interval between pCS and dCS remained constant despite reversal of CS activation sequence. The atrial electrogram morphology and activation sequence at the His and CS sites after block were the same as those during RV pacing after successful, more lateral RF ablation that abolished all evidence of AP conduction.

Figure

Conclusion: Discrete RF lesions in the posterolateral MA vestibule may produce block in a protected zone of circumferential conduction. Such a protected conduction zone could be involved in the genesis of LA reentrant tachycardias.

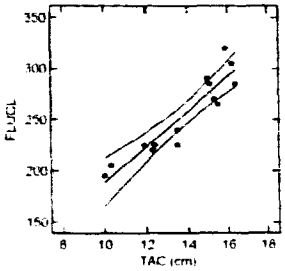
11:00

882-3 Do Tricuspid Annular Dimensions Influence the Cycle Length of Typical Atrial Flutter?

Z.G. Wang, J.G. Kall, D.E. Kopp, M.C. Burke, R. Verdino, D.J. Wilber. *University of Chicago, Chicago, IL, USA*

Recent data indicate that the tricuspid annulus (TA) forms the anterior barrier for the reentrant circuit of human typical atrial flutter (AFl). We hypothesized that if the TA formed the minimum pathlength for the flutter circuit, then the flutter cycle length should be determined, at least in part, by the magnitude of the TA circumference (C). We studied 15 pts with counterclockwise AFl not receiving antiarrhythmic drugs. We used a novel magnetic catheter tracking system capable of precise spatial localization (Biosense) to identify 15–20 TA sites; TAC was determined by the sum of distances between sites.

Results: Mean pt age was 59 ± 12 yrs. Structural heart disease was present in 10 pts (67%). Mean right atrial volume was 109 ± 44 ml, range 42–181 ml (normal range 30–70 ml). The mean AFl cycle length was 253 ± 38 ms (range 195–320 ms); The mean TAC was 13.9 ± 2.1 cm (10–16.4 cm) TAC was a powerful determinant of AFl cycle length ($r = 0.86$, $p < 0.0001$)



Conclusions: Right atrial and TA enlargment are common in typical AFl, and cycle length appears to be largely determined by the TAC over a broad range of atrial dimensions, at least in the absence of antiarrhythmic drugs. These data support the hypothesis that the TA constitutes the minimum pathlength for the circuit of typical human AFl.

11:15

882-4 Are Transmural Contiguous Lesions Essential? Post Atrial Fibrillation Ablation: Lesion Morphology vs. Outcome

B. Avitall, G.N. Gupta, S. Bharati, R. Helms, A. Kotov. *Director of Cardiac Electrophysiology, Section of Cardiology, University of Illinois at Chicago, Chicago IL, USA*

It has been hypothesized that the successful ablation of atrial fibrillation (Afib) will require transmural contiguous lesions. We have histologically evaluated linear lesions placed in 7 dogs (27 ± 2 kg) whose RA appendages were paced at 400 B/M. After developing chronic Afib, the pacing was stopped. Afib persisted until ablation (15 ± 20 days, range 0–50) and was coupled with the development of cardiomyopathy and 4 chamber dilatation. RA and LA linear lesions were generated using a catheter system (BSC/EPT; 24 electrodes, 4 mm wide, 4 mm apart). Linear lesions (N = 53) were created in 5 pre-specified locations: (1) anteromedial loop connecting the tricuspid ring (TR) and SVC and from the SVC to IVC, (2) posterior isthmus lesion connecting the TR and IVC, (3) horizontal circular supramitral lesion, (4) vertical lesion bisecting the pulmonary veins, and (5) vertical lesion lateral to the LA appendage. Power output was applied to maintain 70°C for 60 seconds or until impedance rise. Recovery (43 ± 76 days; range 0–208) was followed by EP and histological evaluations.

Results: Post ablation 3/7 hearts converted to NSR; 4/7 had overdrivable atrial flutter (ODflttr). Despite 12 linear lesions, 1 heart could not be converted